

CLEAN VERSION OF THE CLAIMS

PRODUCTION OF COMPLEX CARBOHYDRATES

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Serial No.: 09/574,460

B1 6. The process of claim 11, wherein the bacteria are *Escherichia coli* K-12 strain JM 109.

Sub C1 7. The process of claim 11, wherein the acceptor molecule is (N-acetyl)galactose.

8. The process of claim 11, wherein the DNA sequence encoding *rfe* is from *Haemophilus influenzae*.

B2 11. A process for the production of a *Haemophilus influenzae*-specific lipooligosaccharide (LOS) which comprises the steps of:

- Sub C2*
- (a) growing in a culture medium gram-negative bacteria comprising (i) a core lipid structure containing a terminal heptose and (ii) a DNA sequence encoding *rfe* (UDP-GlcNAc:Undecaprenol GlcNAc-1 phosphate transferase), and (iii) an isolated DNA sequence encoding a lipooligosaccharide-synthesis gene (*lsg*) from *Haemophilus influenzae*, wherein the *rfe* adds an acceptor molecule to the heptose molecule to synthesize an oligosaccharide; and
 - (b) recovering the *Haemophilus influenzae*-specific LOS from the culture medium.

12. The process of claim 11 wherein the transformed bacteria are *Escherichia coli* and wherein the isolated *rfe* DNA sequence is from *Haemophilus influenzae*.

B3 18. The process of claim 11, wherein the DNA sequence encoding *rfe* is part of the gram negative bacterial genome.

Sub C3 19. The process of claim 11, wherein the isolated DNA sequence encoding the *lsg* is contained in a vector.

20. A method of modifying a terminal heptose of a lipopolysaccharide (LPS) or lipooligosaccharide (LOS) core structure of a gram negative bacterial species containing

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an *rfe* (UDP-GlcNAc:Undecaprenol GlcNAc-1 phosphate transferase) comprising regulating the *rfe* with an *lsgG* gene from *Haemophilus influenzae* in order to catalyze transferring N-acetyl glucosamine onto the terminal heptose.

21. A process for the production of a complex carbohydrate comprising the steps of:
- (a) growing in a culture medium gram-negative bacteria comprising (i) a core lipid structure containing a terminal heptose and (ii) a DNA sequence encoding *rfe* (UDP-GlcNAc:Undecaprenol GlcNAc-1 phosphate transferase), and (iii) an isolated DNA sequence encoding a liposaccharide-synthesis gene G (*lsgG*) from *Haemophilus influenzae*, wherein the *rfe* adds an acceptor molecule to the heptose molecule to synthesize complex carbohydrate, and
 - (b) recovering the complex carbohydrate from the culture medium.

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